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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,086	09/25/2003	Charles W. Alvord	2003P88063 US	6320
28524	7590	06/13/2006	EXAMINER	
SIEMENS CORPORATION INTELLECTUAL PROPERTY DEPARTMENT 170 WOOD AVENUE SOUTH ISELIN, NJ 08830			GREENE, DANIEL LAWSON	
			ART UNIT	PAPER NUMBER
			3663	

DATE MAILED: 06/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/671,086	Applicant(s) ALVORD ET AL.	
	Examiner Daniel L. Greene Jr.	Art Unit 3663	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 April 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 37-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 37-49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. The instant application is directed towards and/or related to the field of target assemblies for use with accelerators for the production of radioisotopes. More particularly to a target assembly, i.e. an apparatus, for containing a fluid for irradiating Oxygen-18 with protons in order to create Fluorine-18.

A review of the instant application's Figures 1 and 3 indicates remarkable resemblance in structure, the similarities of which are proposed to be **recognizable by one of skill in the art**. A review of Figures 3 and 5 also show remarkable resemblance, however it must be noted that Figure 5 is actually a longitudinal cross sectional view offset from centerline and therefore as applicant states in the response received 8/19/2005, pages 11 and 12, the inlet and outlet ports and channels shown in Figure 3 are indeed still present in Figure 5. With the figure similarities in mind, it appears that applicants inventive concept merely includes changing the location of the means for cooling the target assembly from the outside of said assembly to the inside of said assembly and selecting an alternate material of construction, both concepts already well known in the art of nuclear transmutation target assemblies as shown and explained in detail below.

Applicant response received 8/18/2005 includes a declaration from Mr. Charles W. Alvord wherein Mr. Alvord attempts to set forth the metes and bounds of the ordinary skill level of one in the transmutation target art, however it is noted that besides Mr. Alvord's statements alone without presentation of factual proof, said statements can only be construed as an opinion. The Office regrets to inform applicant that no

patentable weight can be given to an opinionated declaration. Consequently, said declaration cannot be relied upon as an adequate response to the issues presented in the previous office action mailed 4/21/2005.

**Please note that no weight is given to an opinion declaration on the ultimate Legal conclusion in issue. See In re Lindell, 155 USPQ 251. See also In re Pike et al, 84 USPQ 235.**

#### ***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/03/06 has been entered.

#### ***Drawings***

3. Applicant's cancellation of all the previous claims alleviates the objection of section 2a from the Final Office action mailed 11/08/05. Accordingly said objection is withdrawn.

4. However, the drawings are now objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore:

A. The embodiment wherein the cooling channels run alongside ONLY a "portion" of a back wall as disclosed in, for example, claims 37 and 44 must be

shown or the feature(s) canceled from the claim(s). No new matter should be entered.

According to Figure 5 it appears that the coolant channels run alongside the entire back wall not "a portion" of a back wall.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification Objection - 35 USC § 112***

**5. The specification is objected to under 35 U.S.C 112, first paragraph, as failing to provide an adequate written description of the invention and as failing**

**to adequately teach how to make and/or use the invention, i.e. failing to provide and enabling disclosure for the reasons set forth in section 8 of the 4/21/05 Office action.**

Applicant's 8/19/2005 arguments, see pages 14-16 have been considered but are unpersuasive of any error.

Applicant's declaration of Charles W. Alvord has also been considered in its entirety however it is not seen where any factual evidence has been presented in support thereof. It appears the entire declaration only sets forth the declarants opinions, unsupported by factual evidence and it is therefore insufficient in overcoming the contentions of the Examiner.

**Please note that no weight is given to an opinion declaration on the ultimate legal conclusion in issue. See In re Lindell, 155 USPQ 251. See also In re Pike et al, 84 USPQ 235.**

As stated in sections 8. A. of said 4/21/05 Office action the specification contradicts itself. Paragraph 27 clearly sets forth turbulent flow, however paragraph 29 contradicts this statement by stating "developed flow," allows for greater heat transfer.

In section 10 of applicant's declaration received 8/19/2005, applicant appears to be defining "fully turbulent flow" as "developed flow". If applicant were indeed attempting to define developed flow as fully turbulent flow then it would appear that a high Reynolds number would indeed be synonymous.

However, as stated in sections 8. C. of said 4/21/05 Office action, it must be noted that nowhere in the specification is there a precise definition set forth for the terms “developed flow”, “nearly developed flow” and “fully developed flow”. Section 12 of applicant’s 8/19/2005 declaration states that these terms and concepts are taught to engineering students in a typical fluid dynamics class, however no factual evidence in support thereof has been presented as to what all is meant and encompassed by said terms.

As shown by any one of Stern (top figure on page 1, and figure 6.7), Kiel et al. (column 10 lines 53+), Nilsson (column 1 lines 55+) or Recktenwald, it appears that these phrases (i.e. “developed flow”, “nearly developed flow” and “fully developed flow”) are related to laminar flow not turbulent flow.

Therefore according to the documentary evidence set forth by the examiner. It is apparent that those skilled in the art would indeed need further explanation and clarification of “such basic concepts” especially when it appears applicant is attempting to apply repugnant definitions to said terms.

**While applicant may be his or her own lexicographer, a term in a claim may not be given a meaning repugnant to the usual meaning of that term. See In re Hill, 161 F.2d 367, 73 USPQ 482 (CCPA 1947).**

Regardless of whether or not the objection to the specification is directed towards the theory of operation, the fact remains that the definitions, limitations, metes and bounds of developed flow, nearly fully developed flow, fully developed flow should have been clearly set forth within the specification itself.

**6. Claims 38, 39, 41-45 and 47-49 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.**

A. Regarding claims 38, 41-44 and 47-49 the limitation “substantially parallel” is considered new matter because there is no adequate description or enabling disclosure of what all is meant and encompassed by the phrase “substantially parallel” since the specification only uses the term “parallel” in for example paragraphs [0021], [0027], etc. and it is not seen wherein the specification as filed uses the term “substantially parallel”. The term “substantially parallel” is not considered as having the identical meaning to the term “parallel ” because the term “substantially” connotes other arrangements of the channels beyond those disclosed. Since the metes and bounds of the limitation “substantially” has not been set forth in the specification as filed, one cannot determine at what point the channels deviate from parallel that the invention will no longer operate as claimed or exactly what the meaning of the limitation “substantially” encompasses. Accordingly the limitation “substantially parallel” is considered new matter.

B. Regarding claims 39 and 45 the limitation “fabricated **substantially** from tantalum” (emphasis added) is considered new matter because there is no



adequate description or enabling disclosure of what all is meant and encompassed by the limitation "substantially". The specification only uses the phrase "the target body is fabricated out of tantalum" in, for example, paragraphs [0021], [0025] "target assemblies of tantalum", etc. and it is not seen wherein the specification as filed uses the phrase "fabricated **substantially** from tantalum" (emphasis added). The phrase "fabricated **substantially** from tantalum" (emphasis added) is not considered as having the identical meaning to the term "is fabricated out of tantalum" and "target assemblies of tantalum" because the term "substantially" connotes other materials of construction beyond those disclosed. Since the metes and bounds of the limitation "substantially" have not been set forth in the specification as filed, the limitation "fabricated **substantially** from tantalum" (emphasis added) is considered new matter.

**7. Claims 37 and 44 are rejected under 35 U.S.C. § 112, first paragraph, because the specification, while being enabling for irradiation by a proton particle beam, does not reasonably provide enablement for irradiation by any other type of particle beam for the reasons set forth in section 12 of the 4/21/05 Office action and further expounded upon in section 8 of the Final Office action mailed 11/08/05.**

Applicant's 8/19/2005 arguments see pages 18-19 have been considered but are not persuasive.

Applicant's 8/19/2005 declaration of Charles W. Alvord has also been considered in its entirety however it is not seen where any factual evidence has

been presented in support thereof. It appears the entire declaration only sets forth the declarants opinions, unsupported by factual evidence.

**Again, please note that no weight is given to an opinion declaration on the ultimate Legal conclusion in issue. See In re Lindell, 155 USPQ 251. See also In re Pike et al, 84 USPQ 235.**

The claims include the limitation "for exposing said chamber to a particle accelerator". The term "particle accelerator" is generic to a host of accelerators neither contemplated nor disclosed in the specification as filed including gammas, Helium, neutrons, electrons, etc.

Wolf et al. (page 360, 3<sup>rd</sup> paragraph) and Ruth et al. (column 1, lines 40-50) clearly disclose that those skilled in the art of fluorine-18 production are fully aware that there are different reaction mechanisms for said production of fluorine-18, which inherently are functional equivalents because the end product is said fluorine-18.

In this regard the examiner has clearly set forth a rejection to claims 37 and 44 in that the limitation "particle accelerator" is broader than the enabling disclosure because this term provides for the use of "equivalent" particles other than protons, however the specification fails to disclose exactly what other particles are capable of being used with the instant invention to produce the same results.

It does not appear that the target would still function if it was bombarded or irradiated with a beam of gamma, Helium, neutron or electron particles

because each of these particles has a different atomic mass and method of interaction with the “target material” as shown for example by Wolf et al. Additionally as shown by Heselius, page 12, 4<sup>th</sup> paragraph the target materials must be carefully chosen to account for example activation of the target chamber, however the specification fails to disclose how and in what manner tantalum would or would not be activated by each and every of the “equivalent” particle beams.

Hence, while the specification may allegedly provide enablement for bombardment with a proton particle beam, it does not reasonably provide enablement for irradiation by any other type of particle beam. It is the examiners position that it would indeed require an undue amount of experimentation to determine such and the statute requires the application itself to inform, not to direct others to find out for themselves; In re Gardener et al, 166 USPQ 138, In re Scarbrough, 183 USPQ 298.

**8. Claims 37-49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

a. Claims 37 and 44 are vague, indefinite and incomplete in what all is meant by and encompassed by the phrase “running alongside a portion” (underlining added). The limitations “alongside” and “a portion” are relative terms that do not positively recite any structural relationship (see the definitions of alongside and nearby already of record) of exactly how near or far the first cooling channel must

be to the upper wall because, for example, it is considered that two lanes of a divided highway do indeed run alongside each other. Additionally the limitation "a portion" is also a relative term that can be assigned no definite meaning as to what exactly constitutes "a portion", again "a portion" of the American population is female, and hence the metes and bounds of the claim are undefined.

b. Claims 41-43 and 47-49 are vague, indefinite and incomplete in what all is meant by and encompassed by the phrase "substantially parallel to said front window" because the claim does not specifically disclose whether it is the "port" or the "outer surface" that is substantially parallel to said front window.

Accordingly the metes and bounds of the claims are undefined.

c. Claims 38, 39, 41-45 and 47-49 are vague, indefinite and incomplete in what all is meant by and encompassed by the phrase "substantially" because the claim does not specifically disclose the metes and bounds of the limitation "substantially". Accordingly the metes and bounds of the claims are undefined.

See the discussion of this topic in sections 6a and 6b above.

d. Claims 37, 38 and 44 are vague, indefinite and incomplete in what all is meant by and encompassed by the phrase "at one end of said target" and "at another end" because the claim does not specifically disclose the metes and bounds of the term "end". Since the term "end" does not connote any particular location, per se, the metes and bounds of the claims are undefined.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**10. Claims 37, 38, 40-44, and 46-49 are rejected under 35 U.S.C. 102(a) as anticipated by APA (Admitted Prior Art).**

Regarding claims 37, 38 and 44, APA clearly discloses a target assembly comprising:

a target body (110);

a target chamber (104) formed within said target body, said target chamber having a front window (310), a rear wall opposite said front window, said rear wall being sloped with respect to said front window and a top wall connecting said rear wall to said front window; and

a first and second cooling channel having a first and second cooling fluid inlet at one end (202, 204, 304, 306, 308) of said target body, a first and second cooling fluid outlet at another end of said target body, and a first and second cooling fluid channel conduit formed in said target body coupling said first and second cooling fluid inlet with said first and second cooling fluid outlet, said first and second channel conduits running along at least a portion of said rear wall and along a portion of said top wall; and

(claims 40, 41, 43, 47, 49) an enriched water inlet port (220) formed in said target body, located at an outer surface of said target body substantially parallel to said front window,

(claim 46) an enriched water inlet channel coupled between said target chamber (106) and said enriched water inlet port,

(claims 42, 43, 48, 49) an enriched water outlet port (222) formed in said target body located at an outer surface of said target body substantially parallel to said front window and

(claim 46) an enriched water outlet channel coupled between said target chamber and said enriched water outlet port in, for example, Figures 1-3 and the specification as filed paragraphs [0008]-[0012].

The limitation “a fluid channel conduit formed in said target body” does not define over the structure of APA because the cooling channels (102), (104), (202), (204), (302), (304), etc. are clearly conduits as per the definition already of record because they are indeed a channel (definition also already of record) through which cooling fluid is conveyed and they are indeed defined by or enclosed within at least the outer surface of the target body. It is noted that the claim language does not require the coolant channels to be completely enclosed within, fully enclosed by, or defined inside or internally to the target body, hence applicant’s amendment has not defined over the APA.

Further regarding claims 38, 43, 44 etc. figures 1-3 show at least 7 cooling channels running in parallel to each other and it can be considered that since the

channels are divided and run alongside both sides of the target body, then there are at least 14 parallel channels.

Further, the upper portions of the cooling channels (302) and (304) run alongside the upper wall and cooling channels (202) and (204) run alongside the back wall of the target chamber.

Also, there is no patentability in the duplication of parts. Simply duplicating the cooling channels would not create a patentably distinct invention.

**Note that MPEP 2144 states that a making separable, rearrangement of parts, duplication of parts and/or changing the shape does not make an invention patentably distinct. See *In re Dulberg*, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961), *In re Japikse*, 181 F.2d 1019 86 USPQ 70 (CCPA 1950) and *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975), *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960), *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)**

**11. Claims 37-49 are rejected under 35 U.S.C. 102(b) as anticipated by "Tantalum [<sup>18</sup> O] Water Target for the Production of [<sup>18</sup>F] Fluoride with High Reactivity for the Preparation of 2-DEOXY-2-[<sup>18</sup>F] Fluoro-D-Glucose," by N. Satyamurthy, Bernard Amarasekera, C. William Alvord, Jorge R. Barrio, Michael E. Phelps, in *Molecular Imaging and Biology*, Vol. 4, No. 1, at 65-70 (2002) (hereafter Satyamurthy) for similar reasons set forth in section 21 of the previous office action mailed 4/21/2005 and further expounded upon in section 13 of the Final Office action mailed 11/08/05 as further explained below.**

Satyamurthy discloses claims 37, 39, i.e. a TANTALUM target assembly comprising:

a target body (1);

a target chamber (2) formed within said target body, said target chamber having a front window (3), a rear wall (4) opposite said front window, said rear wall being sloped with respect to said front window and a top wall (5) connecting said rear wall to said front window; and

a first cooling channel having a first cooling fluid inlet (6) at one end of said target body, a first cooling fluid outlet (7) at another end of said target body, and a first cooling fluid channel conduit (8) formed in said target body coupling said first cooling fluid inlet with said first cooling fluid outlet, said first channel conduit running along at least a portion of said rear wall and along a portion of said top wall; and

(claim 40) an enriched water inlet port (9) formed in said target body, located at an outer surface of said target body substantially parallel to said front window,

an enriched water inlet channel (11) coupled between said target chamber (2) and said enriched water inlet port,

an enriched water outlet port (10) formed in said target body. wherein said enriched water outlet port is located at an outer surface and substantially parallel to said front window and



an enriched water outlet channel (12) coupled between said target chamber and said enriched water outlet port in, for example, Figure 1 as annotated by the examiner and pages 66-69 (already of record).

The cooling channels of Satyamurthy are clearly defined within the target body and as explained above the limitations "running alongside a portion of" cannot be given any definite meaning therefore it is considered that at least the closest portion of the cooling channel does indeed run alongside a portion of the upper wall and the claim language does not define over such interpretation. Further the inlet-cooling channel does indeed run alongside a portion of the back wall of the target chamber as explained above the limitations "running alongside a portion of" cannot be given any definite meaning therefore it is considered that at least the closest portion of the cooling channel does indeed run alongside a portion of the upper wall and the claim language does not define over such interpretation.

Regarding claims 38 and 44, it is considered that from the figure, the upper cooling water outlet arrow indicates one channel and the lower indicates another, another way to look at it is that there are an infinite number of parallel cooling channels disclosed in the Figure because it appears the outlet pipe circumscribes the inlet pipe. Applicant's claim language does not define over the examiners interpretation of the reference. Regardless, there is no patentability in the duplication of parts. Simply duplicating the cooling channels would not create a patentably distinct invention.

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**Note that MPEP 2144 states that a making separable, rearrangement of parts, duplication of parts and/or changing the shape does not make an invention patentably distinct. See *In re Dulberg*, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961), *In re Japikse*, 181 F.2d 1019 86 USPQ 70 (CCPA 1950) and *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975), *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960), *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)**

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**12. Claims 37-49 are rejected under 35 U.S.C. 103(a) as obvious over APA as applied to claims 37, 38, 40-44, and 46-49 above in view of Alvord, Fujiwara et al. Schlyer et al., Amini and further in view of Satyamurthy (all references already of record).**

If applicant is of the opinion that APA does not disclose cooling fluid channel conduits formed in said target body, then any of the references above can be relied upon to show it is clearly known to those of ordinary skill in the art

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to utilize internal cooling channels to cool whatever portion of the target body needs cooling to ensure it doesn't overheat, warp, etc.

At the time of the invention it would have been obvious to one of ordinary skill to locate the cooling channels of APA internally within said target body for the benefits thereof, i.e. localized cooling, etc. as taught to be notoriously old and well known by the references above.

Regarding claims 39 and 45, APA discloses applicant proposed invention substantially as claimed and described above, however APA does not expressly disclose that the target body is fabricated out of tantalum.

Satyamurthy et al. disclose that there has been more that two decades of ongoing development of cyclotron target bodies for the production of the  $^{18}\text{F}$  fluoride ion and discusses the benefits and drawbacks of various materials in the fabrication of said target bodies. Satyamurthy et al. further teaches that the rationale for the choice of tantalum is its relatively low activation by protons and its general chemical inertness and it has a higher thermal conductivity than titanium (another typical target body material)

At the time of applicant's invention, it would have been obvious to one of ordinary skill in the art to fabricate the target body of APA out of tantalum for the benefits of relatively low activation by protons and its general chemical inertness as such is no more than functionally equivalent material.

Further basic thermodynamic principles of engineering can be relied upon to show that when you replace a material that has a high thermal conductivity

with a material that has a low thermal conductivity, some method must be employed to account for the change in heat transfer. Accordingly extra or additional or rerouting of the cooling system must be employed.

Accordingly, it would have been obvious to move the cooling channels from the exterior of the target body to the interior in order to move the cooling system closer to the area where the heat is being produced.

Again, upon review of the Figures it is apparent that applicant has merely changed the material of construction to Tantalum (which the Examiner has shown is known in the art) and moved the cooling channels internally to compensate for the lower thermal conductivity of the new material of construction (which is considered to be no more than a basic thermodynamic engineering principle well known in the art as shown by any of the references above).

**13. Claims 37-49 are rejected under 35 U.S.C. 103(a) as obvious over Satyamurthy as applied to claims 37-49 above.**

If applicant is of the opinion that Satyamurthy does not disclose a second cooling channel, then at the time of the invention it would have been obvious to one of ordinary skill in the art to include any number of cooling channels in Satyamurthy in order to optimize the cooling of the target body as such is no more in the normal use of cooling methods known in the art.

It is well settled that optimizing a result effective variable, i.e. the amount of cooling, is well within the expected ability of a person of ordinary skill in the

subject art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980), In re Aller, 220 F.2d 454, 105 USPQ 233 (CCPA 1955).

**Further, Note that MPEP 2144 states that a making separable, rearrangement of parts, duplication of parts and/or changing the shape does not make an invention patentably distinct. See *In re Dulberg*, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961), *In re Japikse*, 181 F.2d 1019 86 USPQ 70 (CCPA 1950) and *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975), *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960), *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)**

### ***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tilbury Fig. 1 also reads on claims 37 and 40 and discusses Tantalum.


15. Examiner's Note: Examiner has cited particular columns and line numbers in the references as applied to the claims for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant, in preparing the responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner

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16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel L. Greene Jr. whose telephone number is (571) 272-6876. The examiner can normally be reached on Mon-Fri 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

17. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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